What is claimed is:

1. A method for producing an enhanced-resolution image by use of M first low-resolution images associated with a scene, each of the M first images being represented by a set of uniformly sampled and quantized pixels, a relationship of a magnification factor existing between the enhanced-resolution image and the M first images, said method comprising the steps of:

   (a) storing the M first images;

   (b) selecting one from the M first images as a prototype image, and referring the non-selected (M-1) first images to being as (M-1) second images;

   (c) based on the magnification factor, interpolating extra pixels into the set of pixels of the prototype image, and then inferring the values of the extra pixels according to the values of neighbor pixels thereof to produce an interpolated prototype image, and calculating a respective translation between each of the (M-1) second images and the interpolated prototype image;

   (d) dividing the translations of the (M-1) second images by the magnification factor, respectively, to obtain the modulus with respect to the translations of the (M-1) second images, selecting, based on a criteria, one from the second images whose related modulus are the same, and referring the selected second images together with the rest of the second images whose related modulus are not the same to being as N third images, wherein N is equal to or less than (M-1);

   (e) down-sampling the interpolated prototype image N times according to the respective translation between each of the N third images and the interpolated prototype image to produce N fourth images which each corresponds to one of the N third images;

   (f) calculating the difference between each of the N third images and the

corresponding fourth image thereof;

(g) adjusting the values of the pixels of the interpolated prototype image according to an average of the differences calculated in step (f); and

(h) repeating step (e) through step (g), until the values of the pixels of the interpolated prototype image converge to a satisfactory result, and referring the interpolated prototype image whose values of pixels converge to the satisfactory result to being as the enhanced-resolution image.

2. The method of claim 1, wherein step (e) is performed according to the following formula:

$$g_k^{(n)} = (T_k(f^{(n)}) \bullet h) \downarrow s \ ,$$

wherein $g_k^{(n)}$ is the kth forth image at the nth down-sampling process, $f^{(n)}$ is the interpolated prototype image been adjusted n times, h is the blurring operator defined by a point-spread-function, T_k is the transformation operator with respect to the translation between the kth third image and the interpolated prototype image, $\downarrow s$ is the down-sampling operator.

3. The method of claim 2, wherein steps (f) and (g) are performed according to the following formula:

$$f^{(n+1)} = f^{(n)} + \frac{1}{K}\sum_{k=1}^{K} T_k^{-1}(((g_k - g_k^{(n)}) \uparrow s) \bullet p) \ ,$$

wherein $f^{(n+1)}$ is the interpolated prototype image to be adjusted at (n+1) time, K is the number of the third images been calculated, g_k is the kth third image, p is the de-blurring operator, T_k^{-1} is the inverse transformation operator with respect to the translation between the kth third image and the interpolated prototype image, $\uparrow s$ is the up-sampling operator.

4. The method of claim 3, wherein in step (c), the inferring of the values of the

extra pixels based on one selected from the group consisting of a first order interpolation, a third order interpolation and a fifth order interpolation.

5. The method of claim 4, wherein in step (c), the translation (LT_i) between the ith second image and the interpolated prototype image is calculated according to the following steps:

(c-1) assigning at least one interesting point $P_i(x,y)$ on the ith second image, each interesting point corresponding to a local window (w) and a point (u,v) on the interpolated prototype image;

(c-2) calculating an absolute difference ($LAD_i(x,y;u,v)$) between each interesting point $P_i(x,y)$ and the corresponding point (u,v) thereof according to the following formula:

$$LAD_i(x,y;u,v) = \sum_{(m,n)\in w} \left| I_i(x+m, y+n) - I_o(u+m, v+n) \right| ;$$

(c-3) calculating a minimum ($LR_i(x,y)$) of the absolute difference $LAD_i(x,y;u,v)$ calculated in step (c-2) according to the following formula:

$$LR_i(x,y) = \arg\min_{(u,v)} LAD_i(x,y;u,v) ;$$

(c-4) calculating the translation (LT_i) with respect to each interesting point $P_i(x,y)$ according to the following formula:

$$LT_i(x,y) = LR_i(x,y) - (x,y) \bullet \text{magnificat ion factor} .$$

6. The method of claim 4, wherein in step (c), the translation (LT_i) between the ith second image and the interpolated prototype image is calculated according to the following steps:

(c-1) calculating an absolute difference ($GAD(u,v)$) with respect to the whole ith second image according to the following formula:

$$GAD_i(u,v) = \sum_{(x,y)\in i} \left| I_i(x,y) - I_o(u+x, v+y) \right| ,$$

wherein the point (u,v) is a point, on the interpolated prototype image, corresponding to a start point of the ith second image;

(c-2) calculating a minimum ($GR(i)$) of the absolute difference ($GAD(u,v)$) calculated in step (c-1) according to the following formula:

$$GR(i) = \arg\min_{(u,v)} GAD_i(u,v),$$

and considering $GR(i)$ as LT_i.